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ABSTRACT

This study examined what factors contribute to the implementation of technology in the classroom. Specific research questions were: (1) What is the relationship between gender and amount of technology use in the classroom? (2) What is the relationship between years of teaching experience and amount of technology use in the classroom? (3) What is the relationship between type of training in technology use and amount of technology use? and (4) What is the relationship between self-perceived knowledge of technology and amount of technology use? The study was conducted using 64 teachers, 15 from 1 elementary and 49 from 1 secondary school who completed questionnaires concerning the research questions. A statistical analysis of the data resulted in a composite teacher who teaches English or mathematics, has taught between 9 and 22 years, and who has learned to use technology through self-instruction. This study showed that the type of training is not a factor, although knowledge and self-perceived knowledge are strong predictors of the amount of use of technology. Implications for teacher education programs are considered. (Contains 18 references.) (ALF)

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PROFILE OF A TECHNOLOGY USING TEACHER

by

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Paper presented at the 1993 Annual convention of the Eastern Education Research Association, Clearwater Beach, Florida

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Profile of a Technology-Using Teacher

M J Henry

Introduction

Society has undergone noticeable changes in the past few decades. The evolution of technology has resulted in transformations not only in in the work place, but everyday life as well. Business practices have changed, information exchange has dramatically increased, and even transactions such as those that take place at supermarket check-out lines have been affected by the infusion of technology into our lives. Schools have the responsibility of preparing students for effective and responsible lives for the society in which they live (Harrington, 1991). Therefore, it follows that schools should equip our children with skills to live in the so-called information age.

The place of technology in the educational system, and especially in the classroom, is still under investigation. There are critics, as well as supporters, of implementing technology in the curriculum. Critics cite the money that has been poured into schools from government and business for technology related purchases, with no great effect shown on student performance. Supporters insist that access, training, and support are all problems that need to be solved before implementation will be successful (Wild, 1991). Researchers need to ask why there haven't been significant changes in educational outcomes as a result of using technology.

Kerr (1991) asserts that there is little research available relating to how technology is conceived in teachers' thoughts about their work, planning instructional activities, and classroom organization. The classroom life of the teacher is an important variable in determining how technology is being implemented and why some teachers are users of technology, while others are not. This paper addresses the issue of what characteristics are common among those teachers who use technology.

Review of Literature

Role of Technology in Education

There are many who view the reasons for the inclusion of technology in today's curriculum as being related to changes in society. Harrington (1991) states that educators should prepare their students to be full participants for life in a rapidly changing society in which technology will play a more prominent role in what and how they learn. One of the objectives of education is making understandable the world in which one lives, and we live in a technological world (Nickerson, 1988). As Weinstein and Roschwalb (1990) point out, we live in "a wired nation" and our schools should reflect that circumstance in their educational and instructional activities.

Failing Promise of Technology

Technology in the schools has grown by leaps and bounds since the inception of the personal computer. Various estimates of the number of computers in schools are presented with figures such as: (a) from 1981 to 1987, the percentage of U. S. schools with one or more computers used for instruction grew from about 18% to 95%; (b) today it is estimated that there are between 1.5 and 2.1 million computers in public schools; and (c) there is approximately one computer for every 30 students in U. S. schools (Hasselbring, 1991). The technology is present, but for various reasons, the computer has not lived up to its perceived promise of being the solution to the educational ills of today's schools. It has not been the salvation that many had hoped for (Hasselbring).

The mere presence of a computer, or any related technology, is not a guarantee that it will be used effectively. The teacher plays a central role in determining the use of the computer in the classroom and, therefore, has to be informed of how it can be used successfully. As Miller (1992) points out when discussing the multimedia influx in today's schools, "Plain and simple, multimedia is not going to succeed in education unless teachers adopt it as their own " (p. 12).

Reasons for Lack of Use. Most educators are lacking in technological expertise (Hasselbring, 1991; Nicklin, 1992; Miller, 1992; Ray, 1991). Hasselbring cites the Office of Technology Assessment in 1988 as indicating that only one-third of all teachers in Grades K-12 have had as much as 10 hours of computer training. He further cites a national survey of education majors (American Association of Colleges for Teacher Education, 1987) indicating that only 29% perceive themselves to be prepared to teach with computers. Ray states that the majority of today's educators do not understand the how's, why's, and what's of technology. Nicklin sees evidence that many teacher-training programs produce graduates less proficient in technology use than their future students. The lack of motivation as well as the lack of knowledge is seen by Miller as a reason for teachers not using technology.

Another inhibiting factor that contributes to non-use of technology is reported as being that district examinations reward teachers and administrators whose students score well on standardized tests and not necessarily on the understanding and application of what they have learned (Tucker, 1992). Along with this lack of administrative encouragement, the classroom teacher has to face a variety of problems in the school day. Beyond actual instruction time, there are forms, records, grades, tests, and discipline problems that must be attended to, all of which can intrude on the daily classroom schedule. Time is a precious commodity to a teacher trying to learn and use a new technology.

Technology can make possible new avenues of teaching and learning, better suited to human assimilation than methods available before (Nickerson, 1988). However, using a computer must be shown to have advantages for teachers before they will interrupt their usual procedures. Hayden, Gersten, & Carnine (1992) cite findings by Cohen, as well as Loucks and Zacchei, who suggest that technology is more likely to be incorporated if it is "classroom friendly" and does not require major adjustments in organization or instructional procedures.

Fishman and Duffy (1992) determined that periods of change can be very unsettling to a teacher's self-confidence. Personal fears and inhibitions that technology might alter control and authority in their classroom, lack of time (due to city mandated requirements), equipment not being available, and problems scheduling time in the computer lab were cited by Honey and Moeller (1990) as reasons for lack of technology use by teachers. Technology can be viewed as a threat to the teacher's role as the controlling agent of the student's learning; however, it can also be a relief from mundane chores and there is the possibility of more time for teacher interaction with students (Nickerson).

Requirements for Use. Before teachers become willing to unlock the "genie in the bottle", as Tucker (1992) refers to technology, teachers need: (a) well-equipped facilities and an environment that allows them to explore and master the technology; (b) training conducted over years, not days; and (c) on-going technical support (Hasselbring, 1991). Three factors which contributed to successful computer implementation were listed by Sheingold and Hadley (1990) as including: (a) teacher motivation and commitment to student learning and their own development as teachers; (b) support and collegiality experienced in their schools and districts; and (c) access to technology. When these factors are present, teachers can see the advantage of changing practices to include the implementation of technology.

Stages of Technology Use

When all prerequisites, such as motivation, facilities, equipment, time, training, and support, are met, the teacher's use of technology undergoes various stages of implementation. Kell, Harvey, and Drexler (1990) found that it takes two to three years for new users of an innovation to move through the early stages of: (a) awareness and preparation; (b) using the innovation, at first mechanically, then more smoothly; (c) refining its use and integrating it with other modifications in their routine practice; and, finally, (d) assessing its consequences for students. Being comfortable with technology is necessary (Wissick, 1992) before teachers and students can move through levels of entry,

adoption, adaptation, appropriation, and invention when using new technology in their classroom (Dwyer, Ringstaff, & Sandholtz, 1991). These critical elements and stages are necessary steps in the evolution of a teacher's skills and knowledge leading to the effective implementation of technology in the curriculum.

Summary

If our schools are to prepare students for life in the real word, then technology must have a place in the classroom. It is present in most and in abundance in others; however, it has not lived up to its early promise of solving the ills of the educational system. There are various reasons for its failure, but one must look at the role of the teacher in the implementation of any curricular innovation. Teachers do or do not use technology for a variety of reasons. Lack of training, motivation, and administrative support, as well as problems scheduling time and equipment are seen as important factors in non-use of technology. Time must be given for teachers to acquire expertise in the use, integration, and assessment procedures involved with any new procedure in the classroom. Given all the necessary equipment, time, and training, teachers must still find a place in their classroom schedule for use of technology and must be willing to use it, or it will be all wasted effort. The teacher is still the central figure in the implementation of any educational procedure, and must be convinced of the worth of its use.

Purpose of the Study

The purpose of this research investigation was to determine what factors contribute to the implementation of technology in the classroom. The specific research questions asked were: (1) What is the relationship between gender and amount of technology use in the classroom? (2) What is the relationship between years of teaching experience and amount of technology use in the classroom? (3) What is the relationship between type of training in technology use and amount of technology use? and (4) What is the relationship between self-perceived knowledge of technology and amount of technology use?

Design of the Study

Sample

Teachers from two schools, one elementary (n = 15) and one secondary (n = 49), in West Virginia were the subjects of this study (N = 64). Both schools are Professional Development Schools (PDS) and are involved in a collaborative, restructuring effort with West Virginia University known as the Benedum Project.

The elementary school is comprised of 644 students in first through sixth grade (Kindergarten students are housed in another building, but often are transported to the school for activities.) It is described as a rural school, by virtue of its population; there are 38 teachers, one principal, and one vice-principal directing educational activities. The average class size is 24. The secondary school in this study includes approximately 1,400 students in Grades 10 through 12 with one principal and one assistant principal. There are 80 faculty members, who teach an average class of 21.5 students.

Method

Data were collected through responses to questionnaires completed by teachers. Both schools were recommended as sites with a high use of technology by the Assistant to the Director of the Benedum Project at West Virginia University.

Procedures

Responses to questions about teacher background and experience, training in the use of technology, perceived knowledge of technology, and amount of use of technology were extracted from a questionnaire used in another research project investigating the implementation of technology in restructuring schools. Questions such as: "List the number of years experience in current teaching position"; "On a scale of 1 to 5, to what degree is technology implemented in your teaching?"; "My knowledge of technology use in the classroom can be described as: _____Poor _____ Average _____ Above Average"; and "My technological knowledge is _____Self-taught _____A result of formal training" were asked.

At the elementary school, questionnaires were distributed to 38 teachers at a faculty meeting by the principal with the request to return them in two weeks. Fifteen completed questionnaires were obtained for a 39% return rate. From a pool of 80 faculty at the secondary school, 49 questionnaires were completed in the same manner and time frame as in the elementary school, with a return rate of 61%. The total number of subjects was 64. The resultant information was quantified.

Analysis of Data

Simple regressions were conducted using *StatView* statistical software in answering the research questions: (1) What is the relationship between gender and amount of technology use? (2) What is the relationship between years of teaching experience and amount of technology? (3) What is the relationship between type of training and amount of technology use? and (4) What is the relationship between self-perceived knowledge of technology and amount of technology use? Using the same statistical software, frequency distributions were used to describe the sample.

Results and Discussion

The data collected from the sample of 64 teachers were entered into a database and from this information, descriptive and inferential statistics resulted. Frequency distributions were completed on content area (10 elementary teachers were eliminated from this statistic because of overlapping content areas), years of teaching experience, and whether training in technology was formal or self-taught. Of the 54 teachers described by content area, Figure 1 illustrates the results which showed that English (12) and Mathematics (10) were represented to the greatest degree, followed by Social Studies (6); Music, Science, and Business (4 each); Art and Special Education (2 each); Health, Guidance, and Home Economics (2 each); and Physical Education and Computer Science (1 each).

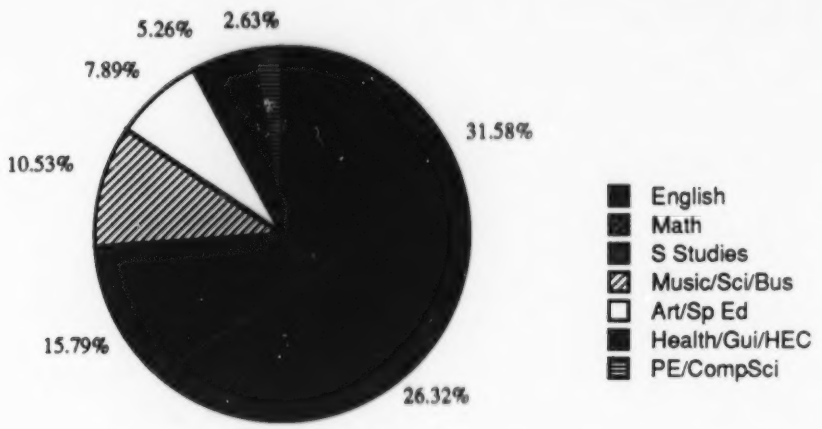


Figure 1

Use of Technology by Content Area

The teaching experience of this sample of 64 teachers ranged from 1 to 31 years. The mean was 15.58 years of experience, while the mode was 13 (See Figure 2). To better illustrate the variable of experience, the sample was grouped into low (1-8 years), medium (9-22 years), and high (23-31 years) categories by using one standard deviation (7.47) above and below the mean for the cut-off points (see Figure 3). The majority (41) of these same 64 teachers taught themselves how to use technology in the classroom, while 23 received formal training (See Figure 4).

X_1: Experience

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
15.578	7.47	.934	55.803	47.953	64
Minimum:	**Maximum:**	**Range:**	**Sum:**	**Sum Squared:**	**# Missing:**
1	31	30	997	19047	0
Mode:					
13					

Figure 2

Frequency Distribution of Teacher Experience

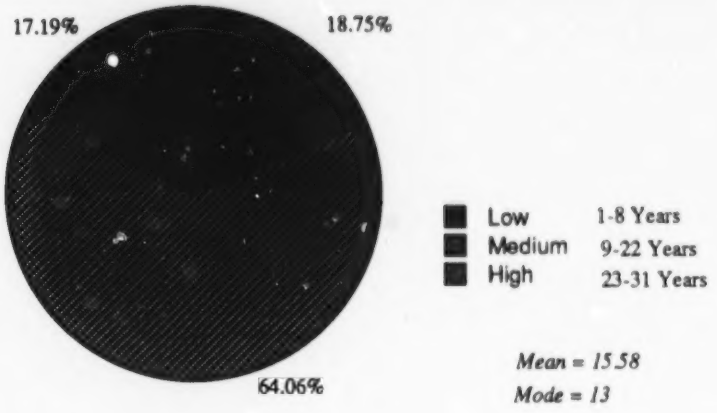


Figure 3
Years of Teaching Experience

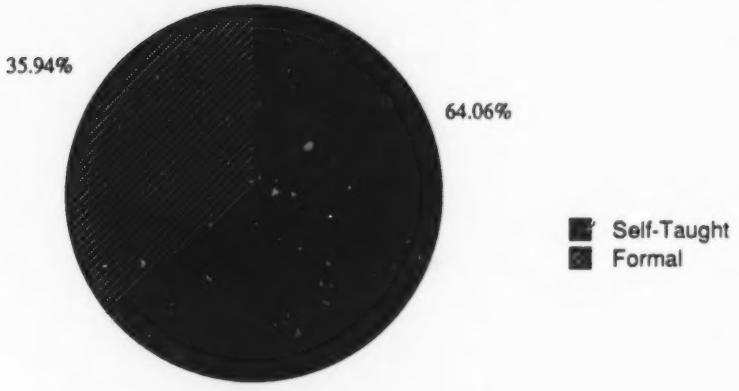
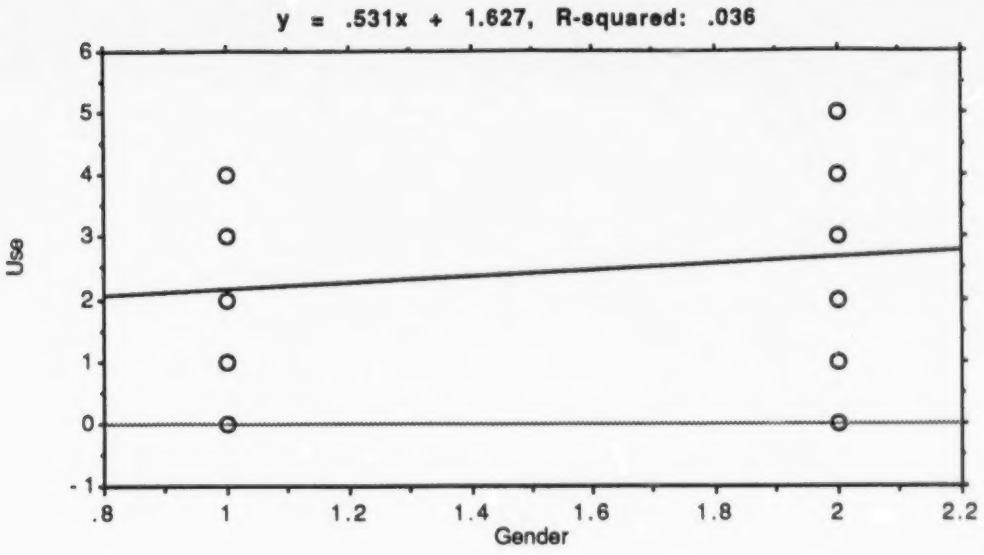


Figure 4
Type of Training

In determining if there was a relationship between gender and amount of technology use, the simple regression results (see Figure 5) showed very little statistical correlation ($p = .1356$). This result could have been influenced by the greater number of female teachers (45) as compared to male (19).



1 = Male 2 = Female

Figure 5

Relationship between Gender and Amount of Use

The relationship between teaching experience and amount of technology use (see Figure 6) showed only a slight association (p = .9625). There was a large range of years of experience (30) in the sample. Results indicated that those with less experience, as well as those with greater experience, used technology.

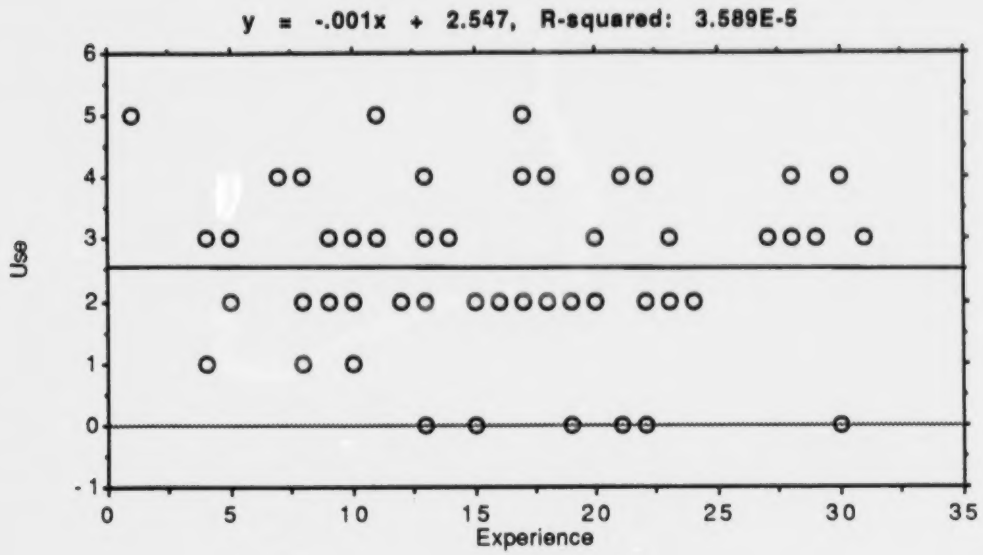
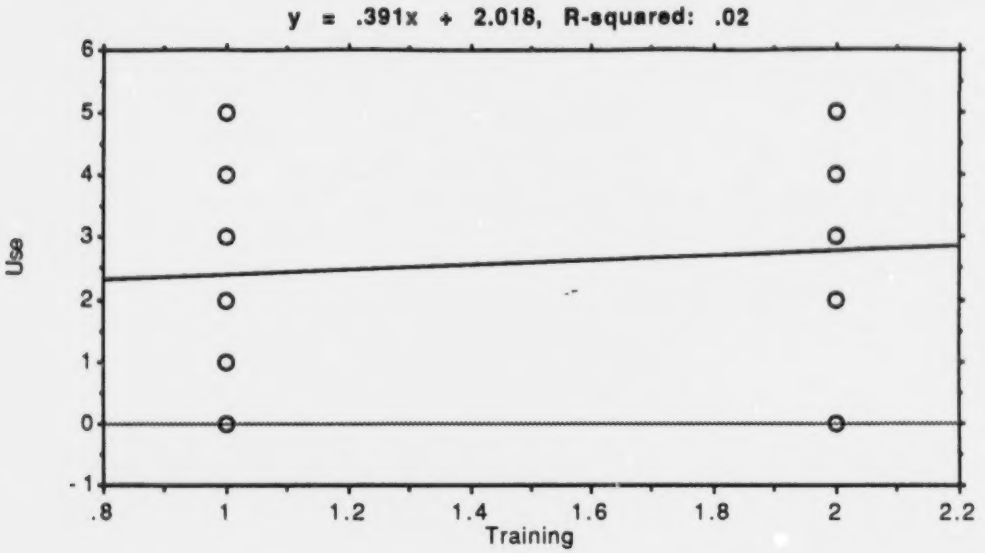


Figure 6

Relationship between Years of Teaching Experience and Amount of Use

The amount of technology use was not relevantly related to whether the teacher had formal training or was self-taught [(p = .267), see Figure 7]. Some of the responses to the question relating to type of training indicated that both types were involved. In these instances (4), the training was entered into the database as formal.

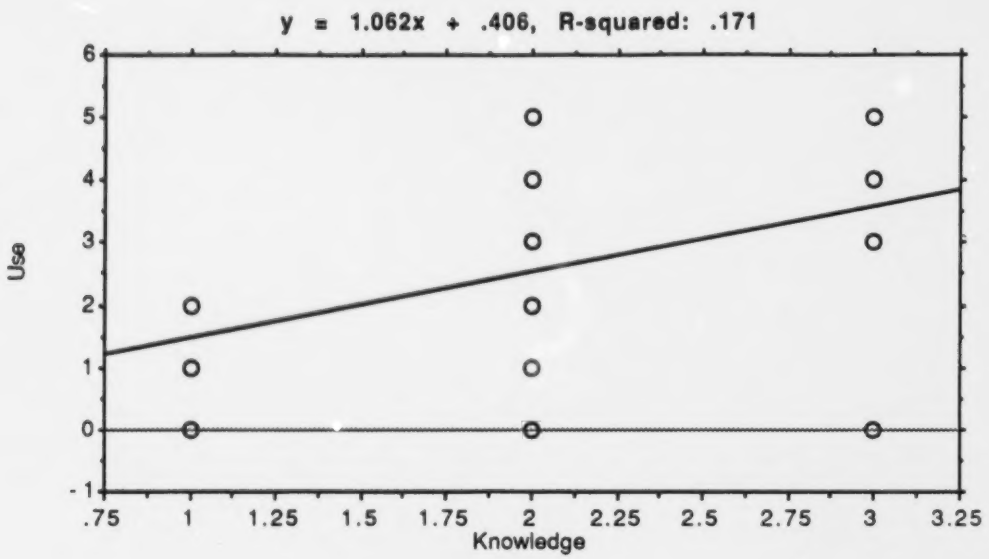


1 = Self-Taught 2 = Formal

Figure 7

Relationship between Type of Training and Amount of Use

A strong relationship between self-perceived knowledge and amount of technology use ($p = .0007$) was determined (see Figure 8). This is a forceful indicator that those who feel knowledgeable about technology will tend to use it more often than those who lack that understanding.



1 = Below Average 2 = Average 3 = Above Average Knowledge

Figure 8

Relationship between Knowledge and Amount of Use

The results have led to the description of a composite teacher who teaches English or Mathematics, has taught between nine and 22 years, and who has learned to use technology through self-instruction. Of all the predictor variables studied (gender, experience, training, and knowledge), only knowledge showed any strong relationship to amount of technology use .

Conclusions

Because of the greater number of female teachers as opposed to males in this study, it is difficult to draw any conclusion about the relationship of gender to technology use. Had the sample been larger and more evenly divided between male and female, then perhaps some inference could have been drawn. The issue of experience seemed to have no great bearing on technology use. Those who have been teaching for a number of years have demonstrated that they are capable of learning and using technology in the classroom, as have those who are new to the teaching profession.

Training is an issue that is at the heart of using technology. This study showed that the type of training (formal or self-taught) is not a factor; however, knowledge is a related variable. Simply put, without the knowledge of how to use technology, it will not be used. The strongest relationship which resulted from this investigation is that self-perceived knowledge is a strong predictor of the amount of use of technology. Even when access to equipment, administrative encouragement, and time are not problems, the teacher must have enough confidence in his/her own ability to implement the technology. This confidence is derived from knowledge through training, either formal or self-taught. From the results of this study, it is obvious that teachers of varying demographics can be taught simultaneously in either instructional format. Once knowledge is acquired, technology is more likely to be implemented.

The implications of a study such as this one are especially important for teacher education programs. By looking at those teachers who are implementing technology in their classroom, a model of necessary background skills can be formed, thus alleviating one stumbling block in classroom management and instructional proficiency. Higher education institutions that prepare teachers need to give sufficient time for the development of adequacy in the area of technology. Novice teachers have survival skills uppermost in their minds in the early years of teaching and to confound the beginning teacher's problems with a lack of technology expertise is needless and can be overcome with planning.

References

Dwyer, D. C., Ringstaff, C., & Sandholtz, J. J. (1991). Changes in teachers' beliefs and practices in technology-rich classrooms. *Educational Leadership, 48*(8), 45-52.

Harrington, J. (1991). Normal style technology in teacher education: Technology and the education of teachers. Computers in the Schools, *8*(1-3), 49-57.

Hasselbring, T. S. (1991). Improving education through technology: Barriers and recommendations. *Preventing School Failure, 35*(3), 33-37.

Haycock, K. A. (1992). *StatView 4.0* [Computer program]. Berkeley, CA: Abacus Concepts, Inc.

Hayden, M., Gersten, R., & Carnine, D. (1992). Using computer networking to increase active teaching in general education math classes containing students with mild disabilities. *Journal of Special Education Technology, XI*(4), 167-177

Honey, M., & Moeller, B. (1990). *Teachers' beliefs and technology integration: Different values, different understandings* (Report No. 6). New York: Bank Street College of Education.

Fishman, B. J., & Duffy, T. M. (1992). Classroom restructuring: What do teachers really need? *Educational Technology Research and Development, 40*(3), 95-111.

Kerr, S. (1991). Level and fulcrum: Educational technology in teachers' thought and practice. *Teachers College Record, 93*(1), 114-136.

Kell, D., Harvey, G., & Drexler, N. G. (1990, April). *Educational technology and the restructuring movement: Lessons from research on computers in classrooms*. (Report No. IR-014735). Paper presented at the Annual meeting of the American Education Research Association, Boston, MA. (ERIC Document Reproduction Service No. ED 326 195)

Miller, M. J. (1992). The multimedia revolution needs teachers, too. *Newmedia, 2*(12), 12.

Nickerson, R. S. (1988). Technology in education: Possible influences on context, purposes, content, and methods. In R. S. Nickerson & P. P. Zodhiates (Eds.), *Technology in education: Looking toward 2020*, Hillsdale, N. J.: Erlbaum Associates.

Nicklin J. (19[illegible] July 1). Teacher's use of computers stressed by education college. *Chronicle of Higher Education*, pp.15-17, A17.

Ray, D. (1991). Technology and restructuring: New educational directions: Part 2. *The Computing Teacher*, *18*(7), 8-12.

Sheingold, K., & Hadley, M. (1990). *Accomplished teachers: Integrating computers into classroom practice*. New York: Bank Street College of Education.

Tucker, M. (1992). The genie in the bottle. *Electronic Learning*, *12*(3), 50.

Weinstein, S., & Roschwalb, S. (1990). Is there a role for educators in telecommunications policy? *Phi Delta Kappan*, *72*(2), 115-117.

Wild, P. The effectiveness of INSET in CAL and IT: An evaluation of the work of an advisory teacher. *Computers and Education, 16*(4), 289-300.

Wissick, C. (1992). Teacher training in multimedia: Content enhancements and considerations for instruction. In R. Boone & K. Higgins (Eds.), *TAM Topical Guide #1* (pp. 8-23). Reston, VA: The Council for Exceptional Children.